

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method comprising:
 - a) —accepting a packet associated with a flow;
 - b) —generating a flow group identifier from the flow;
 - e) —determining whether ~~any~~ other packets associated with the flow group are present in a switch fabric;
 - d) —~~if it is determined that other packets associated with the flow group are present in the switch fabric, then~~ assigning the packet to a path being used by the flow group if other packets associated with the flow group are present in the switch fabric;[[,]] and if it is determined that other packets associated with the flow group are not present in the switch fabric, then assigning the packet to a path using path congestion status information if other packets associated with the flow group are not present in the switch fabric.
2. (Currently Amended) The method of claim 1 wherein ~~the act of~~ generating a flow group identifier from the flow ~~includes~~ comprises hashing a flow identifier.
3. (Currently Amended) The method of claim 1 wherein ~~the act of~~ determining whether any other packets associated with the flow group are present in a switch fabric ~~includes~~ comprises maintaining an outstanding packet counter.
4. (Original) The method of claim 3 wherein the outstanding packet counter is associated with the flow group identifier.
5. (Currently Amended) The method of claim 4 wherein ~~the act of~~ maintaining an outstanding packet counter ~~includes~~ comprises incrementing the outstanding packet counter each time a packet belonging to the flow group is sent into the switch fabric, and decrementing the outstanding packet counter each time a packet belonging to the flow group leaves the switch fabric.

6. (Currently Amended) The method of claim 5 wherein ~~the act of~~ decrementing the outstanding packet counter is performed in response to a message from an output port.

7. (Currently Amended) The method of claim 6 further comprising:
—~~passing-transmitting~~ the message from the output port to a corresponding input element,
—~~passing-transmitting~~ the message from the corresponding input element, through the switch fabric, to ~~another-an~~ output element, and
—~~passing-transmitting~~ the message from the ~~other~~ output element to another input element corresponding to the ~~other~~ output element, wherein the other input element originated the packet.

8. (Currently Amended) The method of claim 3 wherein ~~the act of~~ maintaining the outstanding packet counter ~~includes~~ comprises resetting the outstanding packet counter if it remains non-zero for more than a predetermined period of time.

9. (Currently Amended) The method of claim 1 wherein ~~the act of~~ assigning the packet to a path using path using path congestion status information ~~includes~~ comprises:
—selecting a switch plane having at least one uncongested path, and
—selecting an uncongested path of the selected switch plane.

10. (Currently Amended) The method of claim 9 wherein ~~the act of~~ selecting a switch plane having at least one uncongested path is performed using ~~uses~~ a round robin discipline.

11. (Currently Amended) The method of claim 9 wherein ~~the act of~~ selecting an uncongested path of the selected switch plane is performed using ~~uses~~ a round robin discipline.

12. (Currently Amended) A machine-readable medium comprising:

a first data structure stored thereon, the first data structure comprising a first plurality of entries, each entry comprising a flow group identifier, an outstanding packet ~~in a switch fabric~~ indicator, and a path identifier; and

a second data structure stored thereon, the second data structure comprising a second plurality of entries, each entry comprising the path identifier and path status information, wherein the path status information comprises ~~indicator~~ an indication of whether ~~or not~~ a path ~~has~~ failed and an ~~indicator~~ indication of whether ~~or not~~ the path is congested.

13.-14. (Cancelled)

15. (Currently Amended) ~~Apparatus~~ An apparatus comprising:

- a) ~~an input~~ means for accepting a packet associated with a flow;
 - b) ~~means~~ for generating a flow group identifier from the flow;
 - e) ~~means~~ for determining whether ~~any~~ other packets associated with the flow group are present in a switch fabric;
 - d) ~~means~~ for assigning the packet to a path being used by the flow group if ~~it is determined that~~ other packets associated with the flow group are present in the switch fabric[[,]]; and
- means for assigning the packet to a path using path congestion status information if ~~it is determined that~~ other packets associated with the flow group are not present in the switch fabric.

16. (Currently Amended) The apparatus of claim 15 wherein the means for generating a flow group identifier from the flow comprises means for hashing ~~hash~~ a flow identifier.

17. (Currently Amended) The apparatus of claim 15 wherein the means for determining whether any other packets associated with the flow group are present in a switch fabric ~~maintain~~ comprises means for updating an outstanding packet counter.

18. (Original) The apparatus of claim 17 wherein the outstanding packet counter is associated with the flow group identifier.

19. (Currently Amended) The apparatus of claim 18 wherein the means for ~~maintaining~~ updating an outstanding packet counter ~~increment~~ comprises means for incrementing the outstanding packet counter each time a packet belonging to the flow group is sent into the switch fabric, and ~~decrement~~ decrementing the outstanding packet counter each time a packet belonging to the flow group leaves the switch fabric.

20. (Currently Amended) The apparatus of claim 19 wherein the ~~decrementing of~~ the outstanding packet counter is ~~performed~~ decremented in response to a message from an output port.

21. (Currently Amended) The apparatus of claim 20 further comprising:
—means for ~~passing~~ transmitting the message from the output port to a corresponding input element,
—means for ~~passing~~ transmitting the message from the corresponding input element, through the switch fabric, to ~~another~~ output element, and
—means for ~~passing~~ transmitting the message from the ~~other~~ output element to another input element corresponding to the ~~other~~ output element, wherein the other input element originated the packet.

22. (Currently Amended) The apparatus of claim 17 wherein the ~~means for maintaining~~ the outstanding packet counter is reset if the outstanding packet counter ~~if it~~ remains non-zero for more than a predetermined period of time.

23. (Currently Amended) The apparatus of claim 15 wherein the means for assigning the packet to a path using path congestion status information ~~include~~ comprises:
~~means for~~

- means for selecting a switch plane having at least one uncongested path, and
- means for selecting an uncongested path of the selected switch plane.

24. (Currently Amended) The apparatus of claim 23 wherein the means for selecting a switch plane having at least one uncongested path ~~use~~ uses a round robin discipline.

25. (Currently Amended) The apparatus of claim 24 wherein the means for selecting an uncongested path of the selected switch plane ~~use~~ uses a round robin discipline.

26. (Currently Amended) A method for alleviating head-of-line blocking in an input-buffered switch, wherein the switch comprises ~~includes a plurality of an input modules~~ module, ~~each~~ the input module including virtual output queues and virtual path queues, the method comprising:

- a) — assigning an incoming cell to ~~an appropriate~~ one of the virtual output queues using cell destination information;
- b) — providing a head-of-line cell of the one of the virtual output queues to ~~an appropriate~~ one of the virtual path queues using dynamic path identifier information ~~of the cell~~;
- c) — ~~for an input module to switch plane link~~, selecting, for a switch plane link, one of a number of virtual path queues ~~associated with the link and having at least one~~ a cell; and
- d) — sending the cell ~~form~~ from the selected one of the number of virtual path queues over the switch plane link.

27. (Currently Amended) The method of claim 26 wherein the dynamic path identifier information of the cell ~~was~~ is provided using a dynamic hashing scheme.

28. (Currently Amended) The method of claim 26 further comprising:
- e) — determining whether ~~or not~~ the cell sent over the link ~~was~~ is the last cell of a packet; and
 - f) — ~~if it was determined that the cell sent over the link was the last cell of a packet, then instructing the virtual output queue to send~~ sending cells another cell of a next

associated with another packet to an appropriate one of the virtual path queues if the cell sent over the link is the last cell of the packet.

29. (Currently Amended) ~~For use in a~~ An input module implemented in a switch,
~~an~~ the input module comprising:

a) ~~—~~ a plurality of virtual output queues for accepting cells wherein each of the virtual path queues accepts a head-of line cell from a virtual output queue based on path identifier information; and

b) ~~—~~ a plurality of virtual path queues for accepting head-of-line cells from the plurality of virtual output queues, wherein each of the virtual path queues accepts a head-of line cell from a virtual output queue based on dynamic path identifier information ~~of the cell~~.

30. (Currently Amended) The ~~output~~ input module of claim 29 wherein the number of the plurality of virtual output queues equals a number of output ports of the switch.

31. (Original) The input module of claim 29 wherein the number of the plurality of virtual path queues equals a number of paths through a switch fabric of the switch.

32. (Currently Amended) The input module of claim 29 wherein the number of the plurality of virtual path queues equals ~~a product of a)~~ a the number of switch planes of a switch fabric of the switch multiplied by and b) ~~a the~~ number of paths through each of the switch planes.